wavecom

WMOD2B dual-band 900/1800 or 900/1900 MHz modem

USER MANUAL

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1. PRODUCT DESCRIPTION

The Wavecom WMOD2B modem exists under two dual-band versions:
- EGSM 900/1800 MHz
- EGSM 900/1900 MHz

1.1 Package content

The Wavecom WMOD2B modem package comprises:
- 1 Modem
- 2 holding bridles
- 1 Power supply cable + fuse
- 1 User manual (this document)

1.2 Product presentation

The Wavecom WMOD2B modem supports DATA and FAX transmission, Short Messages (Point to Point and Cell Broadcast) and VOICE calls.
The connectors binded to the body guarantee output and input connections.
An extractible holder is used to insert the SIM card (Micro-SIM type). A LED indicates the operating mode.

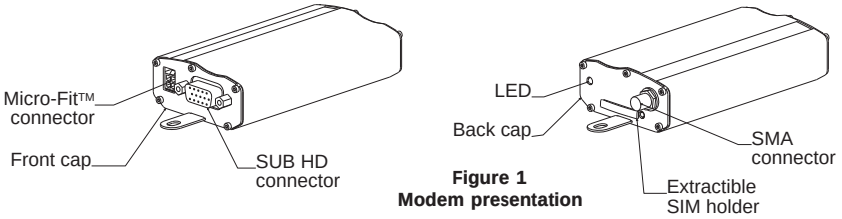


Figure 1
Modem presentation

1.3 Physical characteristics

Dimensions	98x54x25 mm (excluding connectors)
Overall dimensions	110x54x25 mm
Weight	< 130 grams
Volume	13.23 cm^3
Housing	Aluminium profiled

1.4 Functions - GSM Modes

Standard	Dual Band Extended GSM 900 MHz Class 4 (2W) and GSM 1800/1900 MHz Class 1 (1W)
Interface	Serial interface RS232 V.24/V.28 Autobauding function AT command set based on V.25ter and GSM 07.05 & 07.07
SMS	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broadcast. In accordance with GSM 07.05.
Data	Asynchronous 2400, 4800, 9600 and 14400 bits/s. Transparent and Non Transparent mode. In Non Transparent Mode only: 300, 1200, 1200/75 bauds. Mode 3.1 KHz (PSTN) and V110 (ISDN).
Fax	2400/4800/7200/9600 bits/s GSM teleservice 62 in Transparent Mode. Class 2. Groupe 3 compatible.
Audio	Half Rate / Full Rate / Enhanced Full Rate. Accessories (options): handset and car-kit.

1.5 Temperature range

Operating conditions : From -20°C to +55°C
Storage conditions : From -25°C to +70°C

2 INSTALLATION/START-UP

2.1 Mounting the modem

For mounting the modem, bind to the body the holding bridles **according to the schema below:**

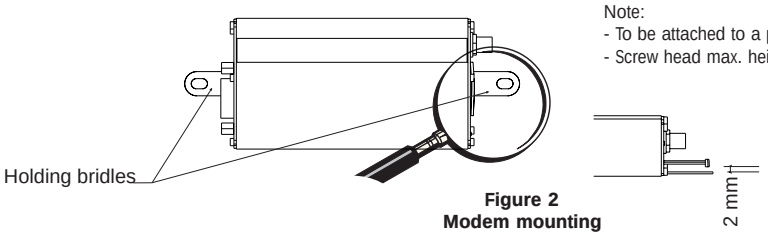


Figure 2
Modem mounting

2.2 Installing the modem

To install the modem, plug the device on a DC power supply (for automotive applications, connect the device on the permanent « + » and insert the SIM card in the holder).

Make sure that an antenna is connected.

In order to extract or to insert the Micro SIM card, it is necessary to press the SIM holder ejector with a sharp element (a pen for example).
If this sequence is not respected, the SIM holder could be damaged.

2.3 Electrical characteristics

2.3.1 Switching the GSM modem on/off

The device is permanently powered (when connected to the power supply).

2.3.2 Voltage range

Voltage range	:	5 to 32V DC
GND	:	0V

2.3.3 Overvoltage/undervoltage

Correct operation of the Wavecom WMOD2B modem in communication mode is not guaranteed if input voltage fall below 5V. The modem is protected against voltage over 32V.
When input voltages exceed 32V, the supply voltage is disconnected in order to protect the electronic components from an overvoltage.

TWO CASES ARE POSSIBLE:

- IF THE OVERVOLTAGE IS CONTINUOUS, THE PROTECTION IS GUARANTEED BY THE FUSE.
- IN THE CASE OF TRANSIENT PEAKS, THE MODEM GUARANTEES ITS OWN PROTECTION.

2.3.4 Power supply cable

A cable, included in the package shall be used for power supply connection.

The wires are marked as follows:

Cable : 1 wire
Ame : tinned copper 24x0.2 mm
Section : 0.75 mm²

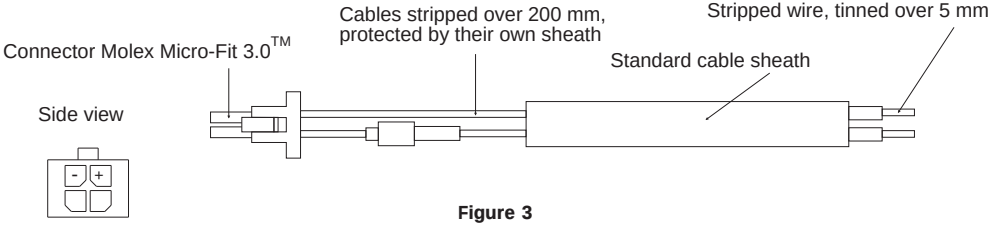


Figure 3
Power supply cable

2.3.5 Input/output electrical characteristics defined for all external connections

Parameters		GSM 900			GSM 1800/1900			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
Power supply @25° C:								
Input supply voltage		5	13.2	32	5	13.2	32	V
Input peak supply current (in communication @ Pmax)	@5V			1.8			1.1	A
	@13.2V			0.7			0.4	A
	@32V			0.4			0.2	A
Input average supply current (in communication @ Pmax)	@5V			330			220	mA
	@13.2V			130			95	mA
	@32V			65			50	mA
Input average supply current in idle mode	@5V			31.4			31.4	mA
	@13.2V			13.2			13.2	mA
	@32V			5.6			5.6	mA
Input average supply current in idle mode (with auto-shutdown of the RS232 driver)*	@5V			8.8			8.8	mA
	@13.2V			4.1			4.1	mA
	@32V			2.2			2.2	mA
Serial link : - RS232								
Audio (head set):								
Microphone input voltage @ lowest gain.				43.8			43.82	mVrms
Speaker output voltage @ maximum gain.				1.65			1.65	Vrms
Speaker impedance		32			32			Ω
SIM			3 or 5			3 or 5		V

* RS232 driver (MAX3238) automatically shutdown after 30s of inactivity on the serial link.
The tests are carried out with a 3V SIM card.
The power consumption might vary of 5% over the whole operating temperature range (-20°C to +55°C)

2.3.6 Protection/on-board network connection

The modem is protected by a fuse directly binded on the power supply cable.

3. DESCRIPTION OF THE INTERFACES

The modem comprises several interfaces:
- LED function indicating operating status
- External antenna (via SMA)
- Serial and control link (via 15 pins SUB D)
- Power supply (via 4 pins Micro-Fit™)
- SIM card holder

3.1 LED Function

- LED off — Device switched off - Not ready
- LED on — Device switched on - Connecting to network
- LED flashing slowly — Device switched on - Idle mode (registered on network)
- LED flashing rapidly — Device switched on - Transmission mode

3.2 Connectors

Connector	Function
SMA	RF antenna connector
15 pins SUB D (high density)	RS232 link AUDIO link RESET
4 pins Micro-Fit™	Power supply connector
" SIM" connector	SIM card connection

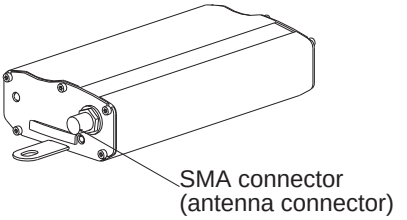


Figure 4
SMA connector

A SIM card is needed to operate on a GSM network.

To install the card:
- Press the yellow button to eject the holder.
- Insert the SIM card.
- Check that it fits into place correctly.

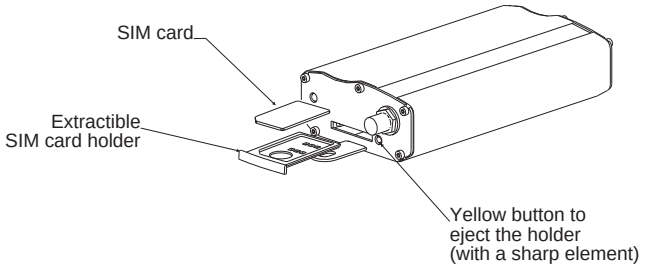
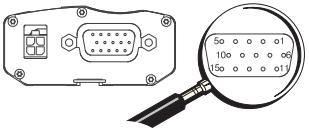


Figure 5
SIM card holder

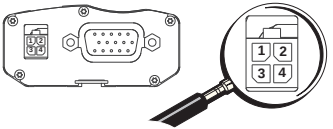
Figure 6
15 pins SUB D connector
(high density)



Pins assignment for
15 pins SUB D Connector

	PIN	EIA	CCIT	Designation
RS 232	1	DCD	109	Data Carrier Detect
	6	RX	104	Receive Data (out)
	2	TX	103	Transmit Data
	8	DTR	108.2	Data Terminal Ready
	9	GND		Signal ground
	7	DSR	107	Data Set Ready
	12	RTS	105	Request to send
	11	CTS	106	Clear to send
	13	RI	125	Ring indicator
Audio	4	MICROPHONE (+)		
	5	MICROPHONE (-)		
	10	SPEAKER (+)		
	15	SPEAKER (-)		
Reset	14	RESET		
	3	RESERVED		

Figure 7
4 pins Micro-Fit™ connector



Connector	Pins layout		Comments
4 pins Micro-Fit 3.0TM	1 2 3-4	V+BATTERY GROUND AUXI	Power supply NC

The 4 pins Micro-Fit 3.0™ can be ordered from a supplier called MOLEX.

4. TECHNICAL DATA

Description	AT commands	Module	Comments
Module synchro checking	AT+CREG ?	CREG=<mode>, 1	Modem synchronised on the network
		CREG=<mode>, 2	Synchronisation lost, re-synchronisation attempt
		CREG=<mode>, 0	Modem not synchronised on the network, no synchronisation attempt
Receiving an incoming call		RING	
	ATA		Answer the call
		OK	
Initiate a call	ATD1234;		Don't forget the « ; » at the end for « voice » call
		OK	Communication established
		CME ERROR : 11	PIN code not entered (with + CMEE = 1 mode)
		CME ERROR : 3	AOC credit exceeded or a communication is already established
Initiate an emergency call	ATD112;		Don't forget the « ; » at the end for « voice » call
		OK	
Communication loss		NO CARRIER	
Hang up	ATH		
		OK	
Enter PIN Code	AT+CPIN=1234		
		OK	PIN Code accepted
		+CME ERROR : 16	Incorrect PIN Code (with +CMEE = 1 mode)
		+CME ERROR : 3	PIN already entered (with +CMEE = 1 mode)
Store the parameters in E2P	AT&W		
		OK	The configuration settings are stored in E2P

5. TROUBLESHOOTING: Specific defaults possibly encountered

5.1 The modem does not answer through the serial link

A) Is the modem correctly powered on?

- ❑ If not, the correct power supply is 5 to 32V.

B) Is the serial cable suitable and adjusted in the modem and PC sockets?

- ❑ A suitable cable must follow pin assignment described on figure 6.
- ❑ Check in particular, that Rx et Tx are properly connected.

C) Check that your communication program is properly configured:

- ❑ Modem factory setting for the character framing are:
  - ➪ Data Bits : 8
  - ➪ Parity : None
  - ➪ Stop Bits : 1
- ❑ The factory setting for the baud rate is 9600 bps.

D) Does any other program interfere with your communication program (conflict on communication port access)?

- ❑ If yes, close any application likely to interfere (e.g. mouse or printer driver).

5.2 The modem always returns «Error» when trying to issue a communication

A) Issue AT+CMEE=1 to have extended error code and retry

Error code	Diagnostic	Hint
0	Phone failure	Call your technical support
3	Operation not allowed	
4	Operation not supported	
10	SIM not inserted	→ Insert the SIM card in the SIM holder of the modem, → If SIM card is inserted, insure that it is clean and properly inserted.
11	SIM PIN required	Enter PIN code
12	SIM PUK required	Enter PUK code (call your network provider if you don't know this code)
13	SIM Failure	Check validity of your SIM card. If SIM damaged, call your network provider
16	Incorrect password	Check the code you entered
17	SIM PIN2 required	Enter PIN2 code
18	SIM PUK2 required	Enter PUK2 code (call your network provider if you don't know this code)
26	Dial string too long	Check your phone number (max 20 digits)
30	No network service	

For all other codes, and/or details, see AT commands manual.

B) Additional hints

- ❑ Is the modem registered on the network?

Does the AT-Command AT + CREG? answers 0,1 (registered) or 0,5 (registered roaming)?

- ⇨ If not, check that the received signal is strong enough to synchronize on the Network (use AT+CSQ).

- Is the modem receiving an incoming call or already in communication?
  - With some software versions, you must release any incoming or active call (with ATH) before being able to make an outgoing call.

5.3 The modem always returns «No carrier» when trying to issue a communication

A) After a failed attempt ("no carrier"), issue AT+CEER to have extended Error code

Error code	Diagnostic	Hint
1	Unallocated phone number	
16	Normal call clearing	
17	User busy	
18	No user responding	
19	User alerting, no answer	
21	Call rejected	
22	Number changed	
31	Normal, unspecified	
50	Requested facility not subscribed	Check your subscription (data subscription available?)
68	ACM equal or greater than ACMmax	Credit of your pre-paid SIM card expired
252	Call barring on outgoing calls	
253	Call barring on incoming calls	
3, 6, 8, 29, 34, 38, 41, 42, 43, 44, 47, 49, 57, 58, 63, 65, 69, 70, 79, 254	Network causes	See AT commands manual for further details or call network provider

For all other codes, and/or details, see AT commands manual.

B) Additional hints

- Is the antenna properly connected?
  Use an antenna with the following features:
  - Frequency range : dual-band GSM 900/1800 or 900/1900 MHz.
  - Impedance : 50 Ohms.
  - Gain (antenna + cable) : 0dBi.
  - VSWR (antenna + cable) : -10dB.

- Is the received signal strong enough?
  - With the AT-Command AT+CSQ check that the received signal (1st parameter of the response) is strong enough to be able to establish a call.

AT+CSQ response (RSSI)		Signal quality
11 to 31	→	Should be sufficient*
0 to 10 and +99	→	Could be insufficient*

* based on general observations.

- The modem always returns «No carrier» when trying to issue a voice communication?
  - Insure the character «semicolon» is present straight after the phone number on the AT-Command ATD######;

- The modem always returns «No carrier» when trying to issue a data communication?
  - Insure the selected bearer type is supported by the called party.
  - Then, insure the selected bearer type is supported by the Network.
  - If no success, try bearer selection type: AT+CBST=0,0,3.
  - Insure the SIM Card is available for Data/Fax calls.

5.4 Further questions

For further troubleshooting information, please check our Frequently Asked Questions on www.wavecom.com (customer support section).

6. REFERENCE ACCESSORIES

The following accessories have been qualified for the WMOD2B modem:

- Dual-band antenna : ALLGON 1140.26
- Antenna adaptor : SMA/FME adaptor from PROCOM
- Power adaptor (Europe): EGSTON N2 EFSW 12V 1A mounted with micro-fit connector from MOLEX.

7. NOTES ON SAFETY

7.1 General Safety

The modem is designed for and intended to be used in fixed and mobile applications. “Fixed” means that the device is physically secured at one location and is not able to be easily moved to another location. “Mobile” means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter’s antenna and the body of the user or nearby persons. The Modem is not designed for a intended to be used in portable applications (within 20 cm of the body of the user) and such uses are strictly prohibited.

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency, RF, interference. Please follow the safety advice given below carefully.

- Switch OFF your GSM Modem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.
- Switch OFF your GSM Modem when at a refueling point.
- Switch OFF your GSM Modem in hospitals and any other place where medical equipment may be in use.

- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.

- There may be a hazard associated with the operation of your GSM Modem close to in adequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufactures of the medical device to determine if it is adequately protected.

- Operation of your GSM Modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers recommendations.

7.2 Vehicle Safety

- Do not use your GSM Modem while driving, unless equipped with a correctly installed vehicle kit allowing 'Hands-Free' Operation.

- Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.

- If incorrectly installed in a vehicle, the operation of GSM Modem telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, ensure that the installation has been performed by a qualified personnel. Verification of the protection of vehicle electronics should form part of the installation.

- The use of an alert device to operate a vehicle's lights or horn on public roads is not permitted.

7.3 Car And Maintenance

Your GSM Modem is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestion below will help you to enjoy this product for many years.

- Do not expose the GSM Modem to any extreme environment where the temperature or humidity is high.
- Do not attempt to disassemble the GSM Modem. There are no user serviceable parts inside.
- Do not expose the GSM Modem to water, rain or spilt beverages, It is not waterproof.
- Do not abuse your GSM Modem by dropping, knocking, or violent shaking. Rough handling can damage it.
- Do not place the GSM Modem alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the phone.
- The use of third party equipment or accessories, not made or authorized by Wavecom may invalidate the warranty of GSM Modem.
- Do contact an authorized Service Center in the unlikely event of a fault.

7.4 Your Responsibility

This GSM Modem is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy therefore keep it in a safe place at all times and out of the reach of children.
Try to remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

8. GENERAL INFORMATIONS

GSM reference documents : GSM 03.40, GSM 03.45, GSM 04.11, GSM 04.21, GSM 05.08, GSM 07.01, GSM 07.02, GSM 07.05, GSM 07.07.

ETSI contact : ETSI Secretariat
F-06921 Sophia Antipolis Cedex, France
e-mail : secretariat@etsi.fr

Service : The AT commands manual is available from your local modem supplier.

Disclaimer
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